

# **ARPA-E VEHICLE ENERGY STORAGE TECHNOLOGIES ANNUAL PROGRAM REVIEW**

**IP Strategies for Solving Conflicts, Speeding Adoption and  
Rewarding Innovation**

**Dan Abraham, MPEG LA**

# Acknowledgements

- Matt Rappaport, Managing Director, IP Checkups



- John Platt, Partner, Snell & Wilmer



- Larry Horn, CEO, MPEG LA LLC
- Peppino Kim
- Jonathan Brown
- Jessica Sullivan



- Jako Eleveld, Head of IP Licensing, Philips



# Agenda

- Intellectual Property has become a valuable and contentious asset in the Advanced Battery Industry
- Drawing upon lessons from other industries, we will address how IP creation and enforcement may affect a burgeoning industry

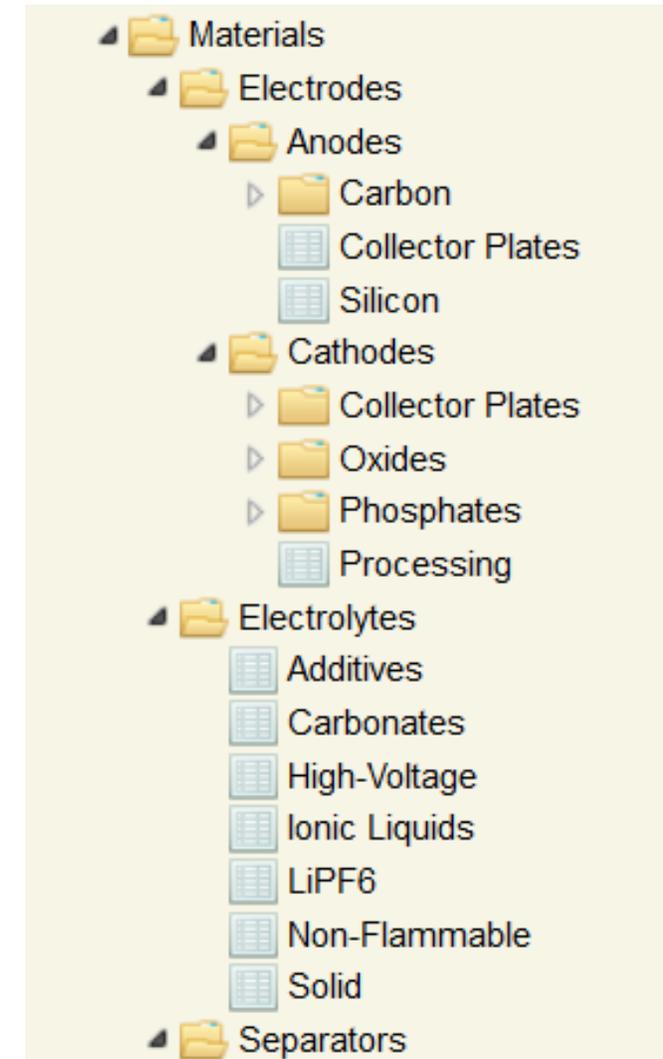
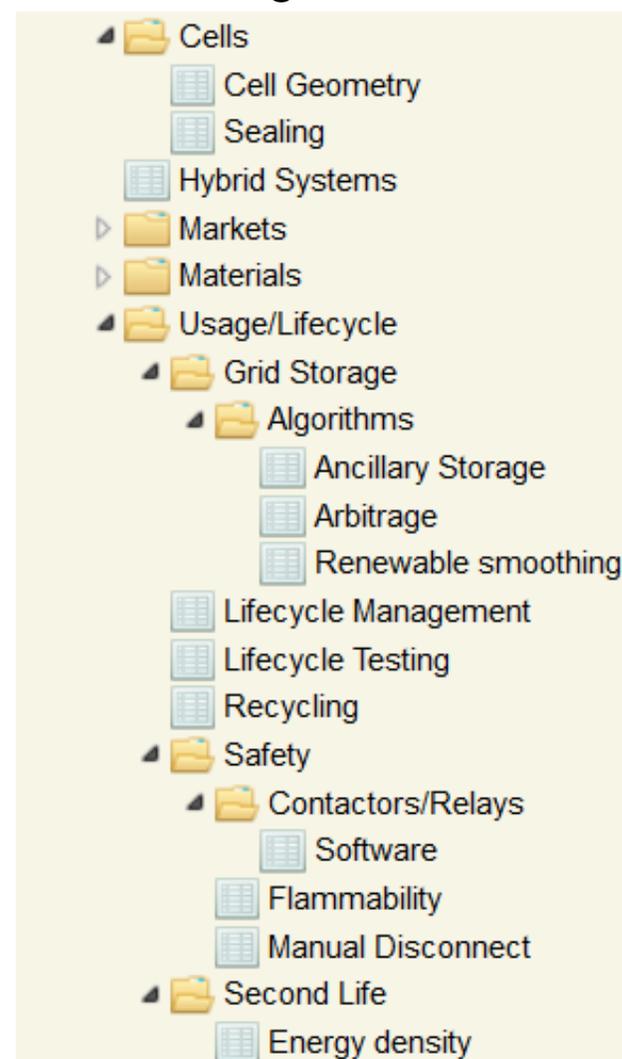
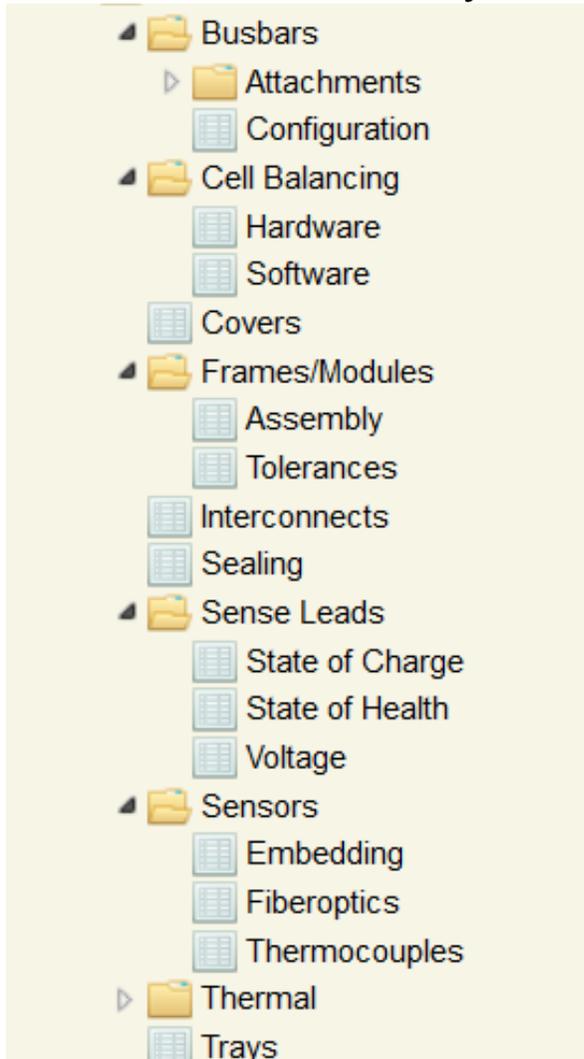
We will explore:

- Strategies for avoiding battery IP wars in a manner that fosters industry-wide development and growth
- New opportunities for making IP rights widely available while rewarding IP owners for their innovation

# What Does the Advanced Battery IP Landscape Look Like?



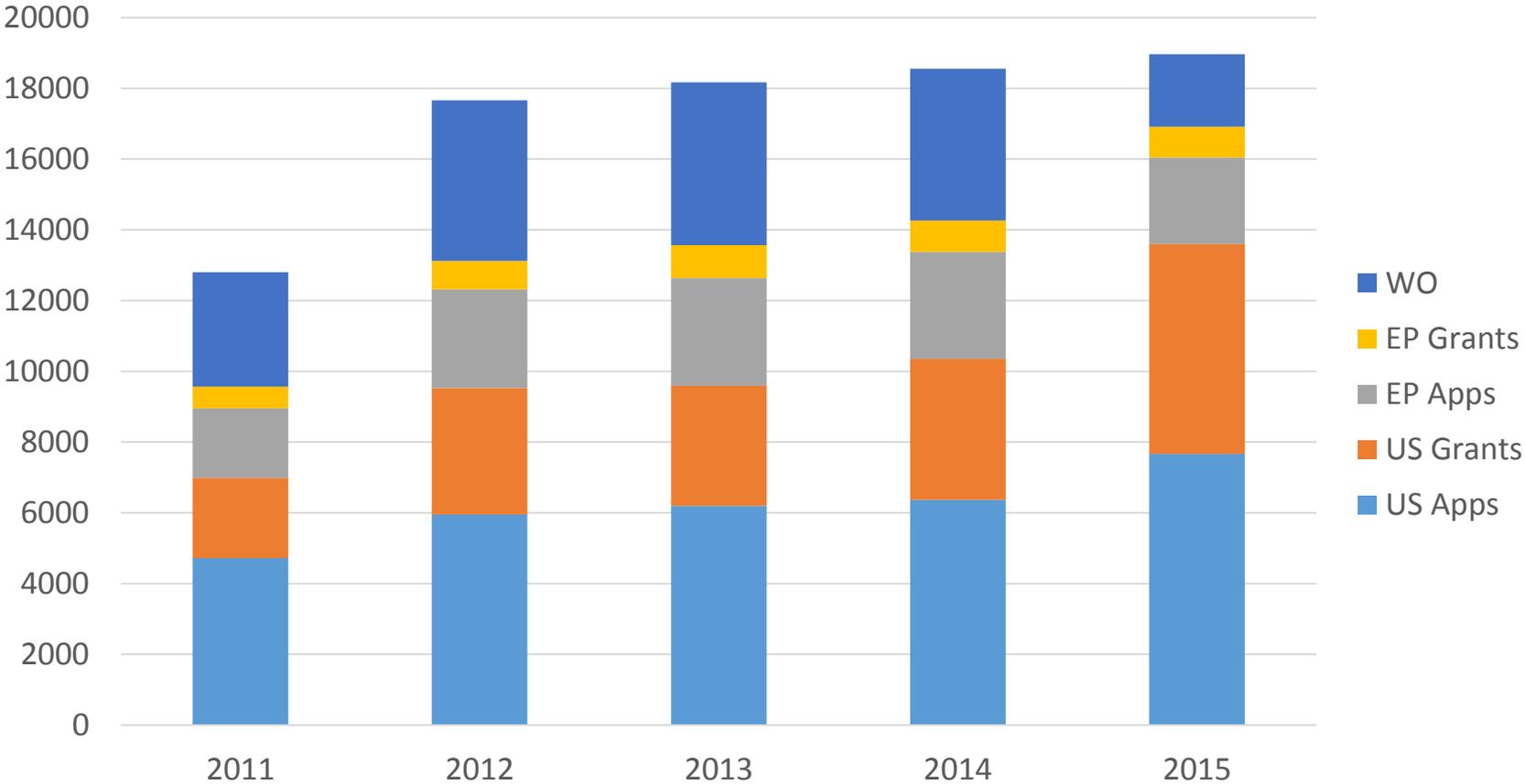
## Advanced Battery & Capacitor PatentEdge™



# Battery Patent Trends 2015 - Overview



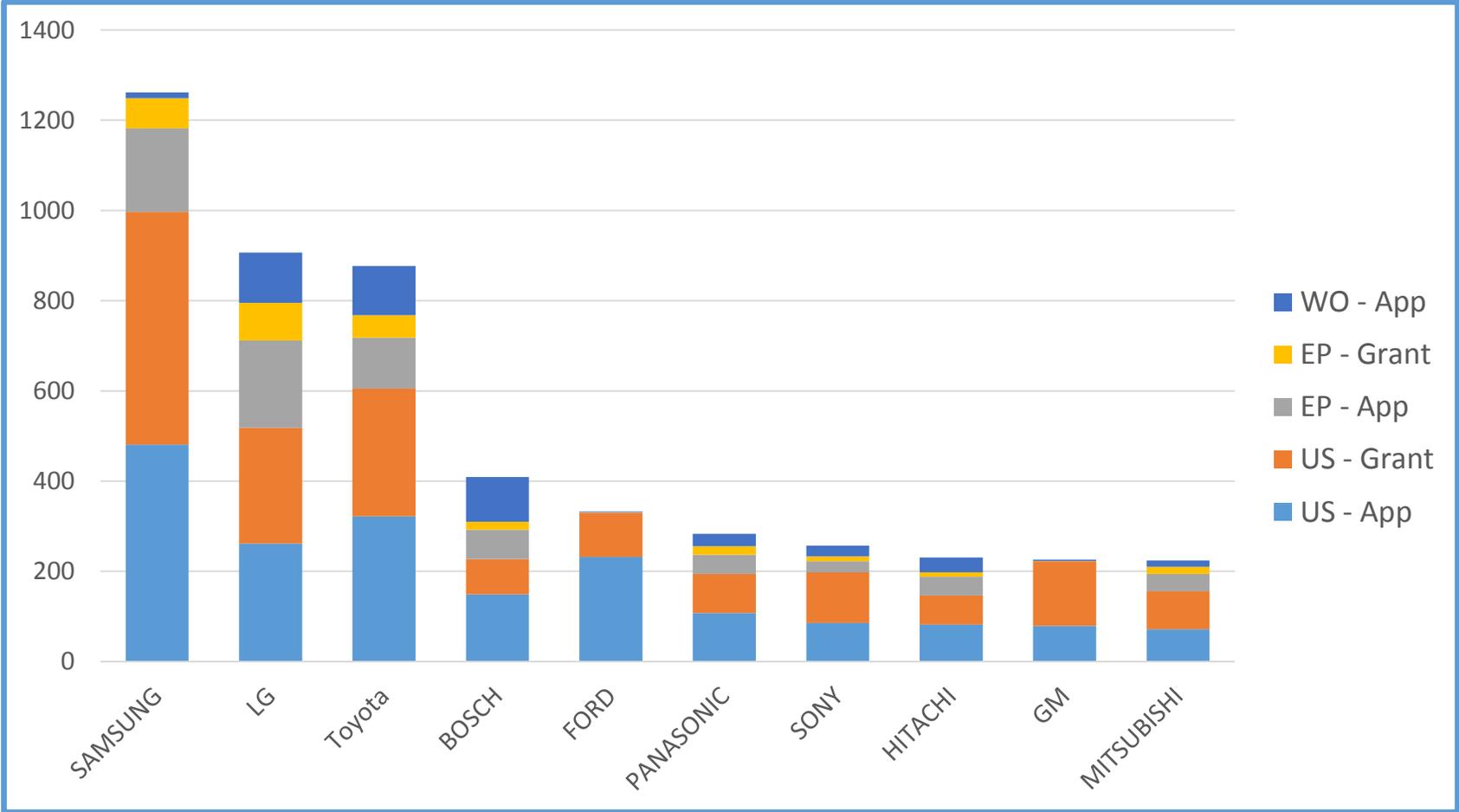
- Nearly 19,000 battery patents & apps published worldwide ~ 1500 per month
- Overall, 2015 activity grew by 4% from 2014



# Battery Patent Trends 2015 - Assignees



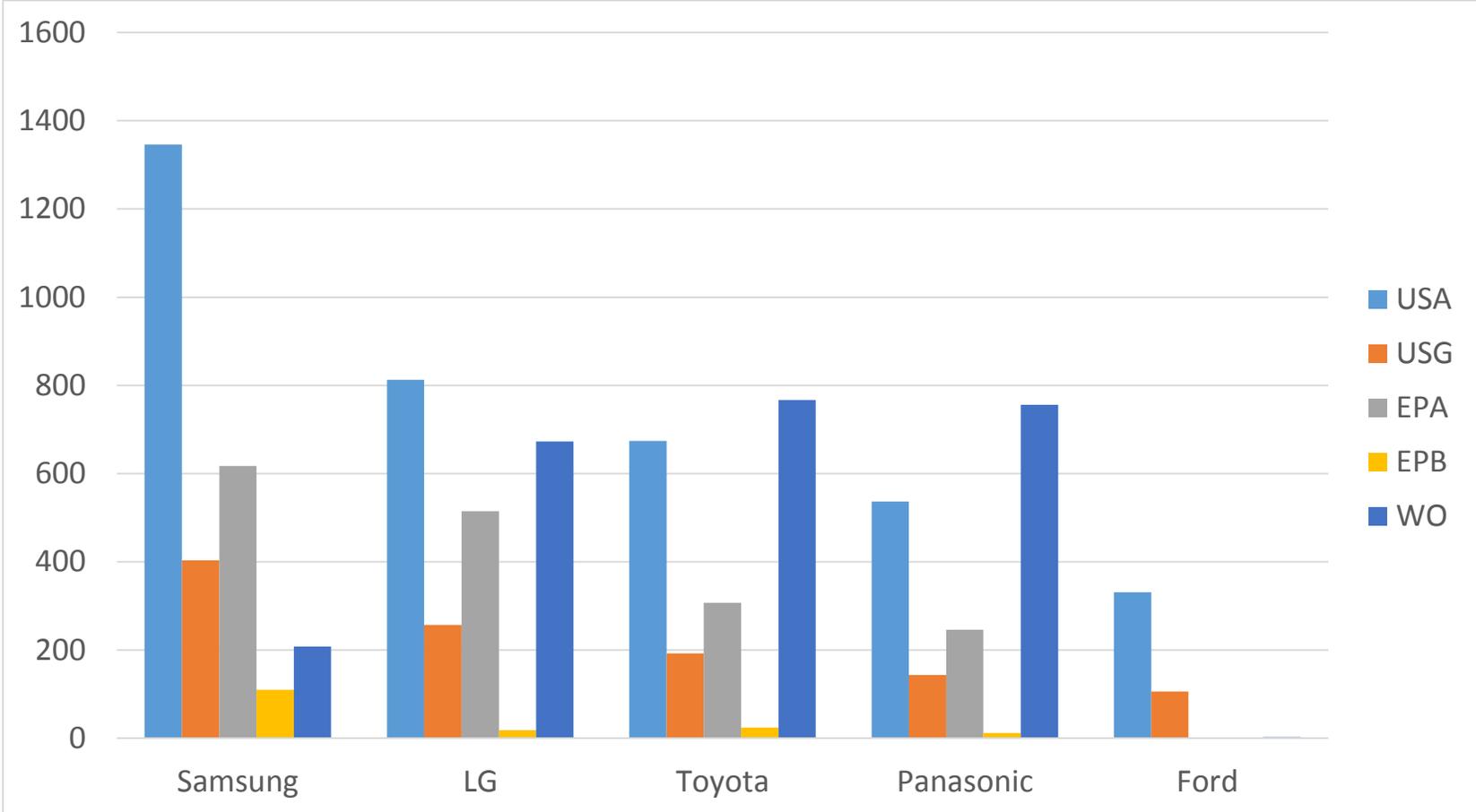
- Top 10 assignees account for nearly 1/3 of all patents published in 2015
- Samsung, LG, & Toyota remain the top assignees.
- 70% are US patents



# Battery Patent Trends 2015 – Large Cos



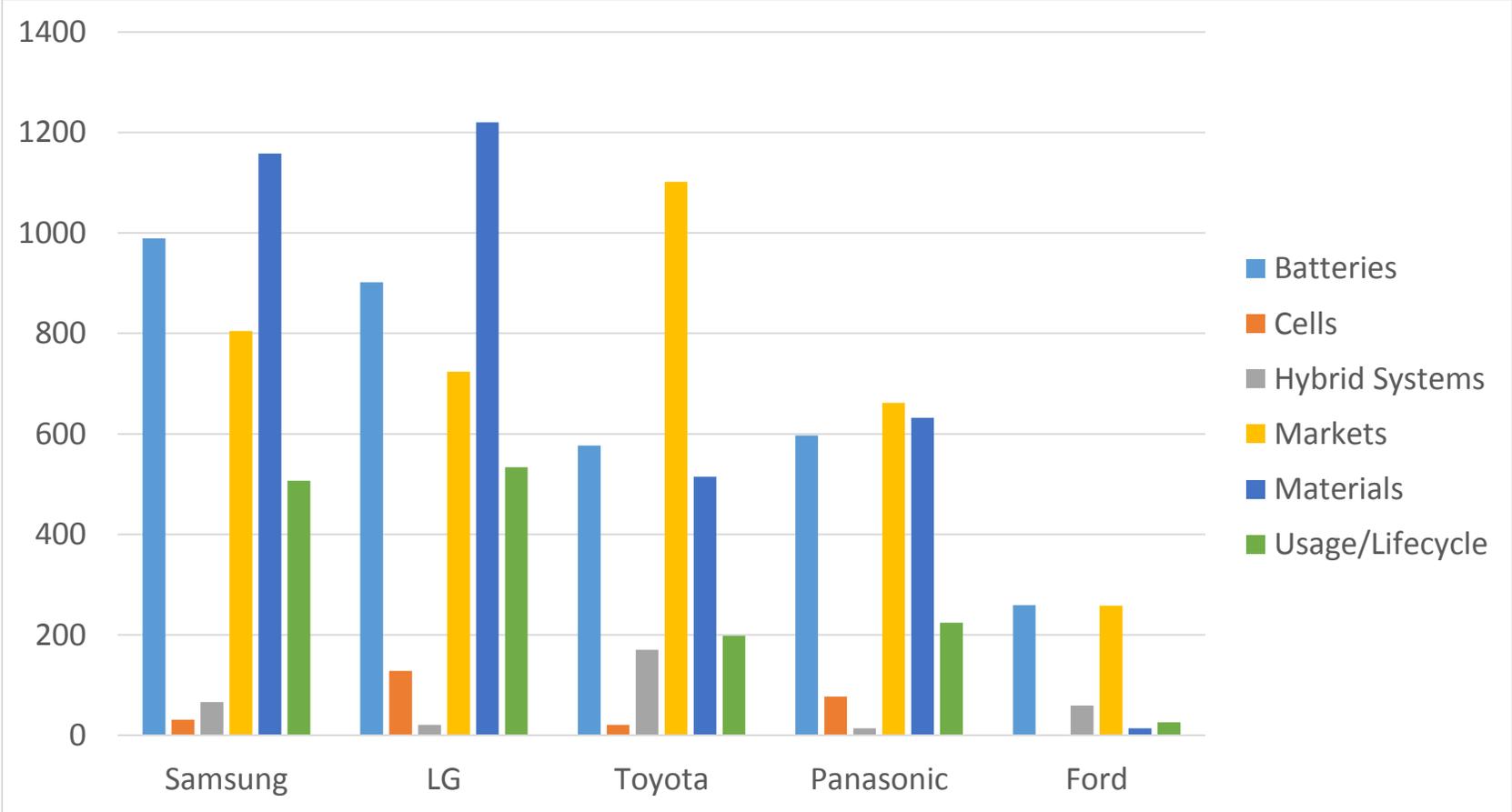
- Large companies maintain different geographic filing strategies



# Battery Patent Trends 2015 – Large Cos



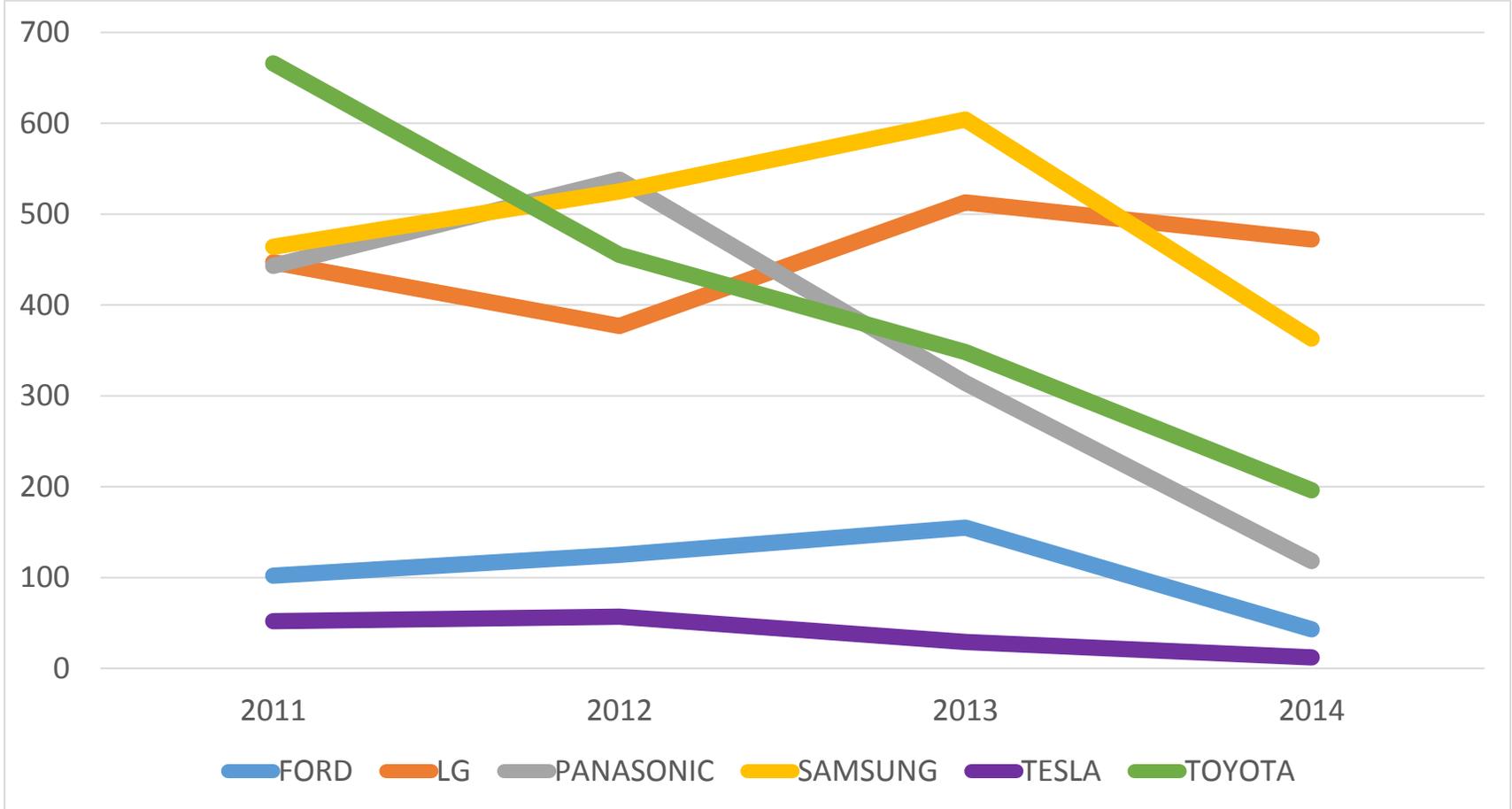
- Large companies focus filings on different technology areas



# Battery Patent Trends 2015 – Large Cos



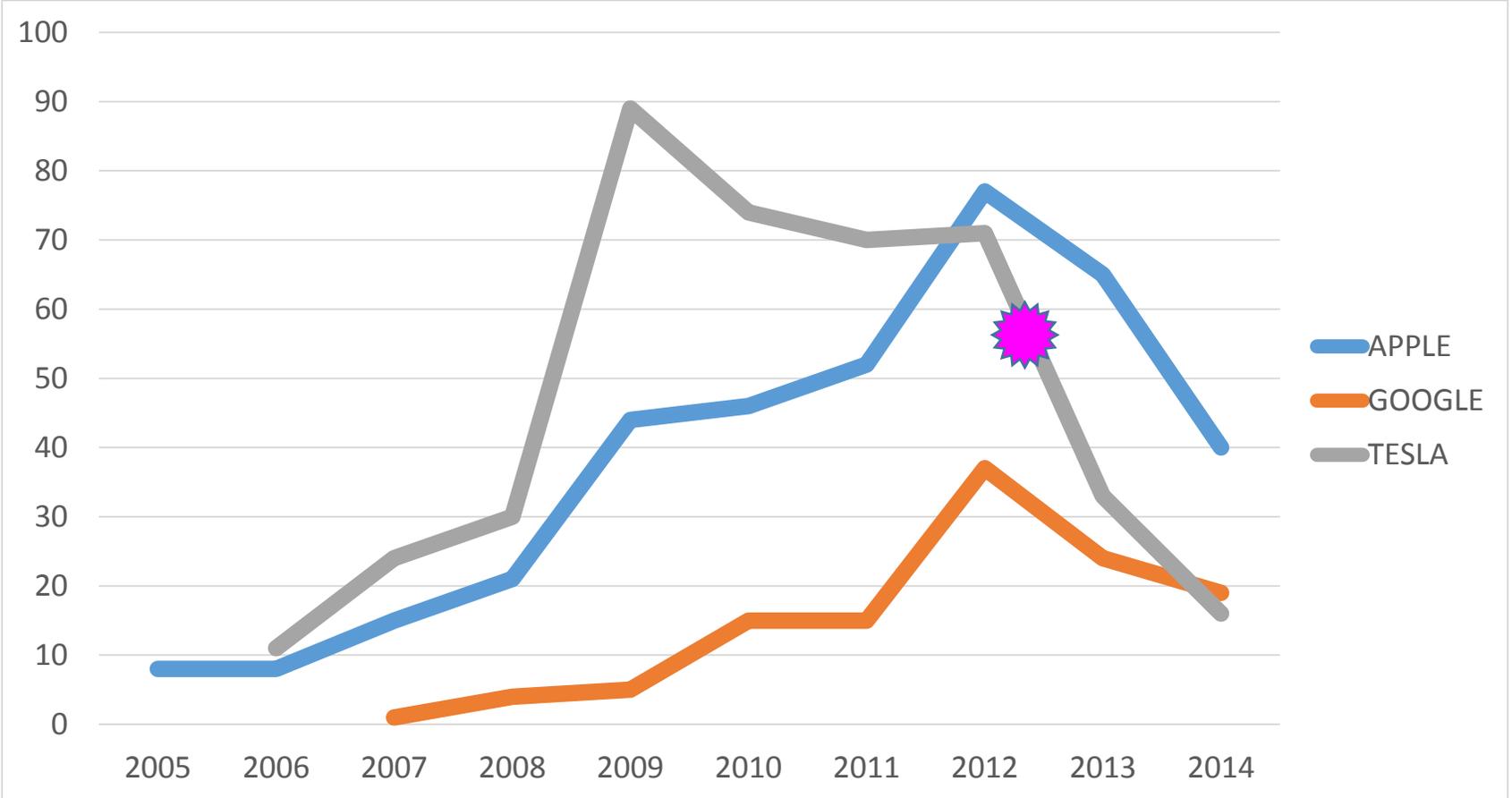
- Large companies US & WO patent filing velocity 2011-2014



# Battery Patent Trends 2015 – SV Cos



- Silicon Valley companies' patent filing velocity 2005-2014
- Tesla announces opening its portfolio in June of 2014



# Battery Patent Trends 2015 – Notable events

- Toyota offers ~ 6000 fuel cell patents on a royalty free basis
- Unified sets up “Automotive Zone” Toyota, Honda & 20 others join
- Ford subscribes to Intellectual Ventures, RPX and LOTNET
- Hyundai/Kia joined the Open Invention Network Community
- Youxia X unveils a copy cat of the Tesla model S

Youxia Ranger X

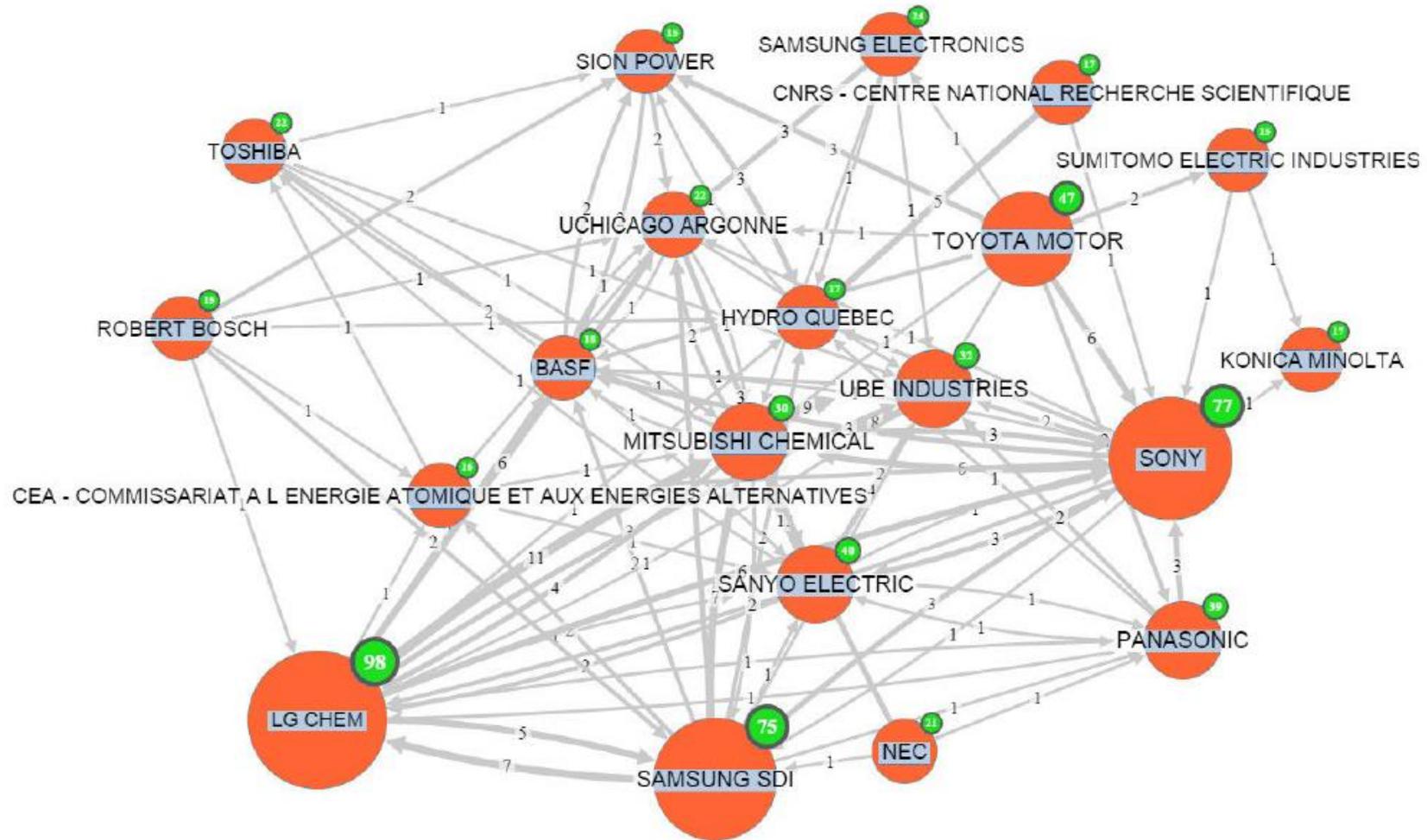


Tesla Model S



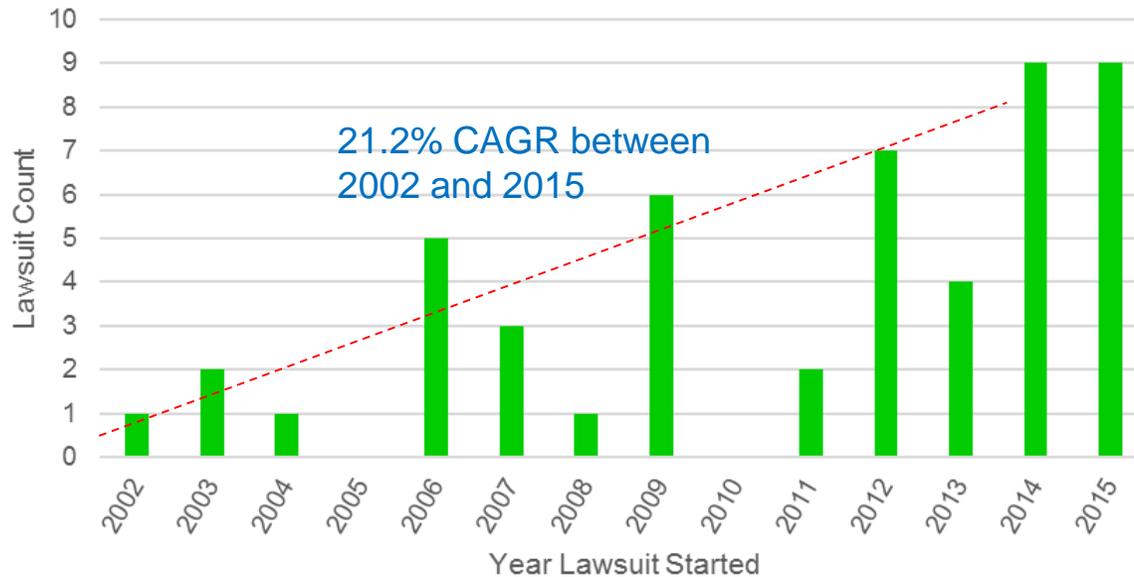
# Li-Ion Electrolyte Patent Assignee Dependency by Citation

*Players dependency by citations*



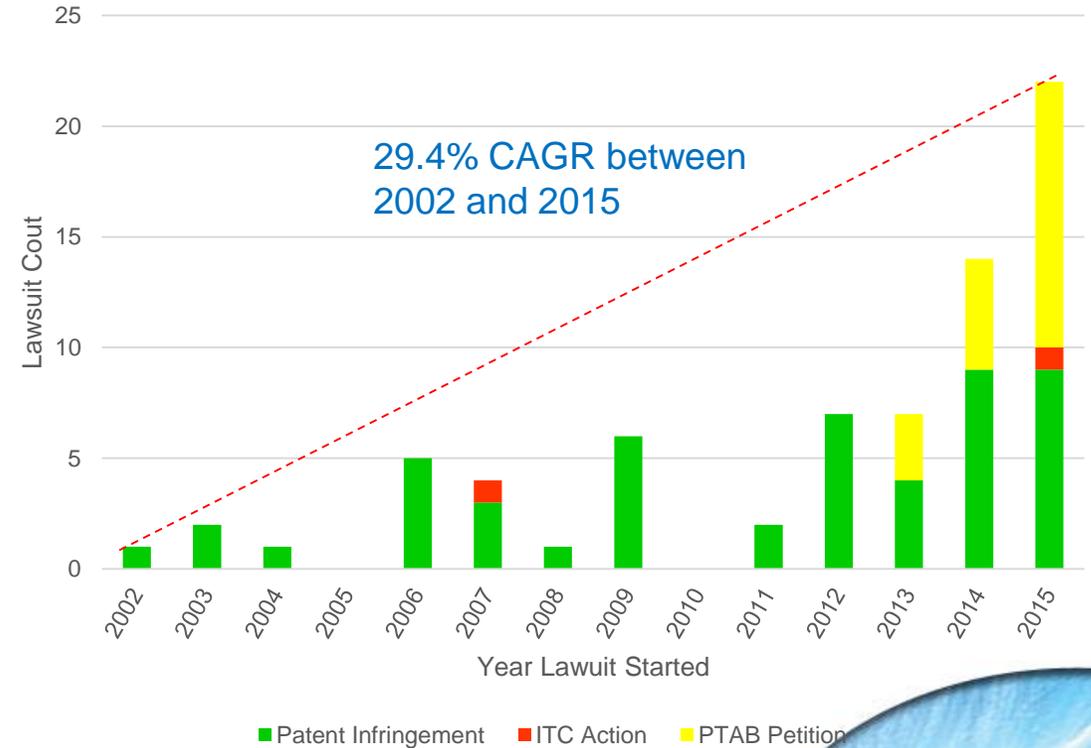
# Growing Industry + Increasing IP = Litigation

## Li-ion Battery Patent Infringement Cases per Year



Source: RPX/PatentFreedom

## All Li-ion Battery Lawsuits per Year



# A Few Exemplary Patent Litigation cases:

- **Hydro-Quebec / University of Texas v. A123, Black & Decker, Segway, etc.** - “cathode materials for rechargeable lithium batteries”, 6 patents, 5-6 year litigation battle. Settled in 2011.
- **BASF / UChicago Argonne (LG, GM) v. Umicore** – “Lithium metal oxide electrodes” 2 patents 6,677,082 and 6,680,143. Filed 2000. Issued 2004. Litigation ongoing.
- **Northern Cable and Automation LLC v. General Motors Co.** – “hybrid vehicle battery connector part.” Patent filed 2009. US Patent 7,976,333. Suit filed July 2013, ongoing.
- **LG Chem v. SK Innovation v. Celgard** – “battery separator membrane for Rechargeable Lithium Battery” US Patent 6,432,58, filed 2000, issued 2002. On going litigation.
- **Milwaukee Electric Tool Corp v. Snap-On, Inc.**, - “multi-cell lithium ion batteries in cordless electric tools.” 3 patents, filed ~2002, issued 2011. Settlements with various cordless tool companies.

# Estimated Cost to Li-Ion Battery Industry thru 2020

	Median Case	90 <sup>th</sup> Percentile
Cost per Litigant (1)	\$5M	\$12M
Estimated cost 2002 to 2015 (2)	\$260M	\$624M
Projected cost for next 5 Years (2016-2020) (3)	\$462M	\$1108M
Total Cost to 2020	\$722M	\$1732M
Including PTAB	\$768M	\$1800M

(1) Based on AIPLA 2015 Report of Economic Survey

(2) 50 cases for Li-ion Battery patent infringement cases and 2 ITC cases

(3) Using a 17% CAGR and a base of 10 infringement cases started in 2015; excludes PTAB cases

# Patent Strategies

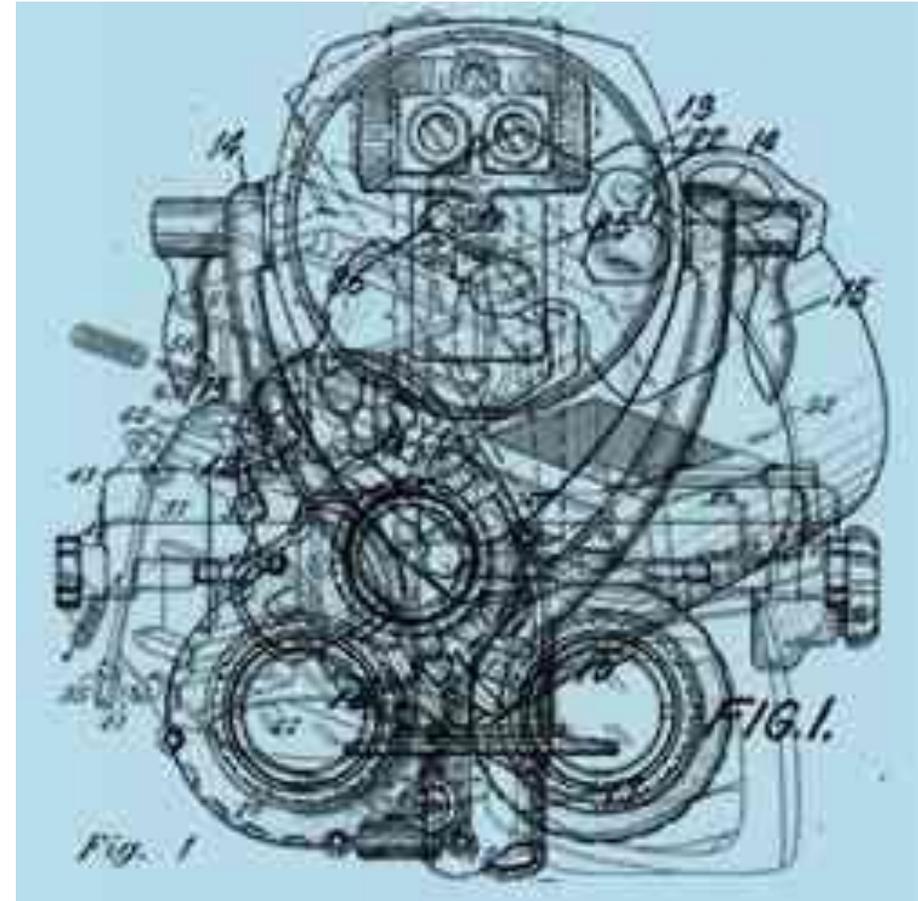
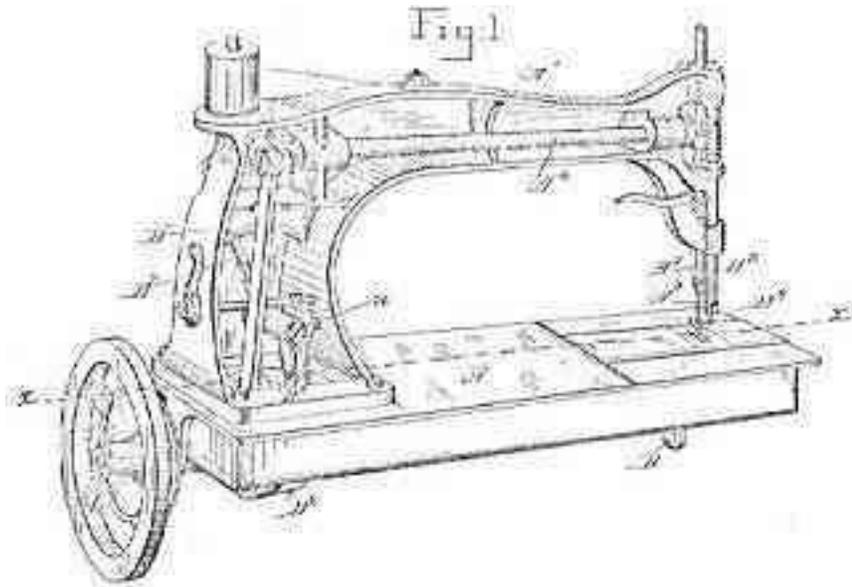
- Establish a Patent Program:
  - Encourage Invention Disclosures – rewards
  - Patent Review Committees
  - File early – US is now a First Inventor to File country
  - Have inventors assign their rights in the inventions
  - These steps increase IP ownership certainty
  - Fraction of the cost of Patent Litigation
- Effective Patent Portfolio:
  - “White Space” around core inventions
  - Structure, function, performance across value chain
  - Where are your markets? Making? Using? Selling?
- Competitor Landscape searches.
  - Where is the competition going?
  - Where is the unplowed territory?

# Strategies (cont'd.)

- File Blocking Patent Applications: File patents on what your competitors are trying to do.
  - Makes it harder for your competitor to get patents.
    - Publications to create land-mines of prior art.
  - Creates counter-suit / cross-licensing opportunities.
- Patent Pool Strategy
  - Licensing to enable the market and provide ROI to Technology Innovators
  - Note: LFP Licensing AG – IP Licensing effort around LFP cathode technology (est. 2011)

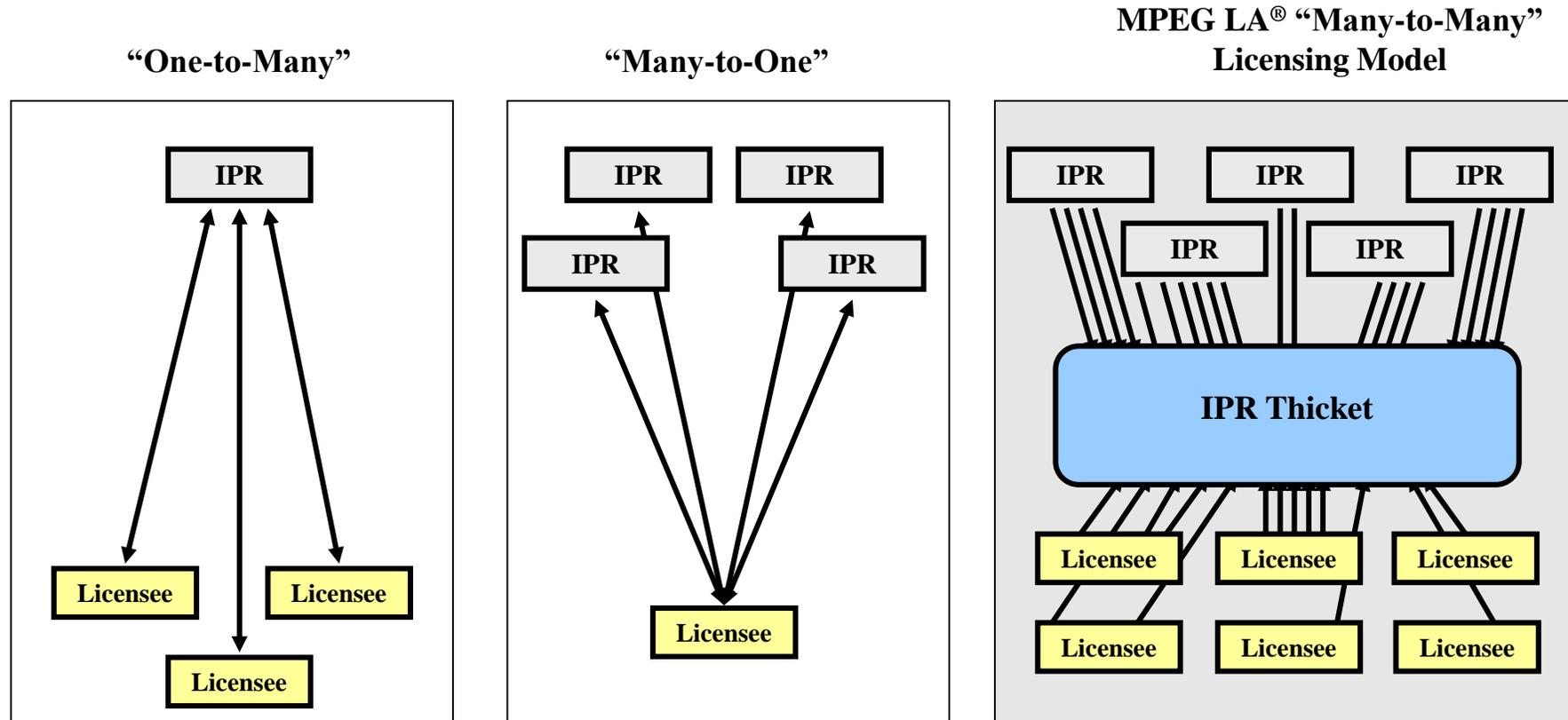
# Problems with Thickets

- Complementary blocking IP
- Uncertain Freedom to Practice
- Litigation Risk
- Licensing is expensive and time consuming
- Royalty Stacking
- Uncertainty in Market Adoption





# MPEG LA<sup>®</sup> Licensing Model



MPEG LA pioneered modern patent pool licensing

# MPEG LA<sup>®</sup> Licensing Model

- **The MPEG-2 digital video standard faced uncertainty around patent licensing, but the transactional efficiency afforded by the MPEG LA<sup>®</sup> Licensing Model helped make it the most successful standard in consumer electronics history**
  - ~ 10 billion devices
  - ~ 65 billion video discs
  - ~ \$5 trillion in product sales

# Many IP Aggregating Entities with Different Goals

- Via Licensing (Dolby) – Audio Codecs
  - Sisvel – Wireless standards
  - Philips – CD, DVD3C
  - Samsung – Blue-Ray
  - One Blue (Sony, Philips,...) – Blue-Ray
- 
- Standards Pools**

- Intellectual Ventures
  - MPHJ Technology Investments
- 
- Patent Assertion Entities**

- Unified Patents
  - Lotnet
  - RPX
- 
- Defensive Entities**

- Librassay (MPEG LA) – Molecular Diagnostics **(Technology)**

# MPEG LA<sup>®</sup> Licensing Model

- **Convenient one-stop licensing alternative that assists licensees with their technology choices**
  - **Efficient Access**
  - **Transparency**
  - **Freedom to operate**
  - **Reduced litigation risk**
  - **Predictability in the business planning process**
  - **Opportunity for a level playing field**
  - **Reduces Royalty Stacking**
- **In turn, it enables inventors, research institutions and other technology owners to monetize and speed market adoption of their assets to a worldwide market while substantially reducing the cost of licensing**

# MPEG LA<sup>®</sup> Licensing Model

- The solution has become the template
- Today MPEG LA operates licensing programs (around many standards that are among the most successful in consumer electronics history) consisting of some 11,000 patents in 80 countries with some 200 patent holders and 6,000 licensees
- MPEG LA is also working on mass market licensing solutions in molecular diagnostics, oligonucleotide therapeutics, gene editing, medical devices, energy storage and nanotechnology

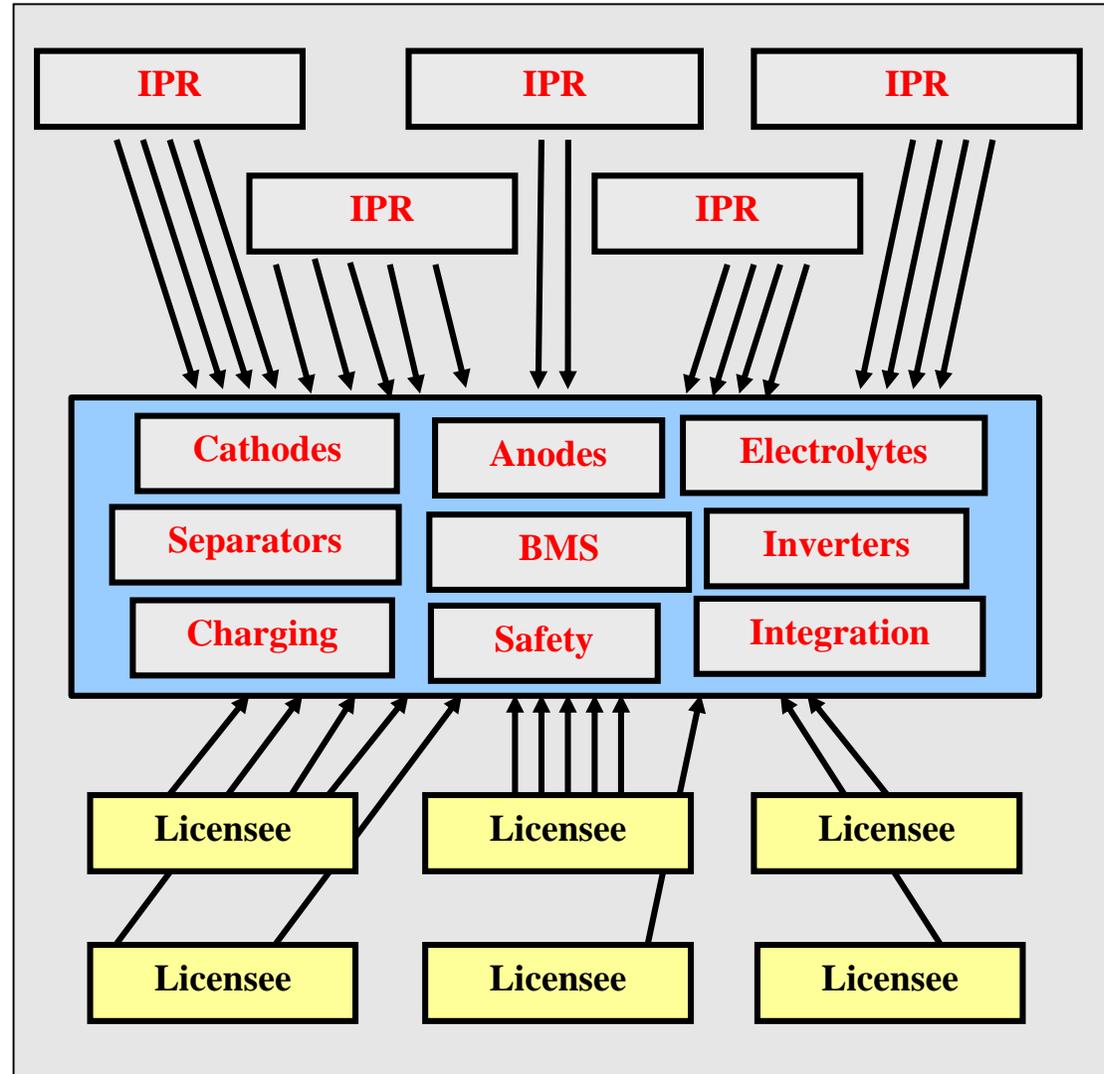
# MPEG LA Patent Pools

February 14, 2016 Data

MPEG-2 <i>Program started in 1997</i>	Started with 8 patent owners 102 patents	<ul style="list-style-type: none"> <li>• Currently 27 patent owners</li> <li>• 1082 patents in 57 countries</li> <li>• 1791 Licensees</li> </ul>
ATSC <i>Program started in 2007</i>	Started with 6 patent owners 41 patents	<ul style="list-style-type: none"> <li>• Currently 10 patent owners</li> <li>• 520 patents in 28 countries</li> <li>• 166 Licensees</li> </ul>
AVC/H.264 a/k/a MPEG-4 part 10 <i>Program started in 2004</i>	Started with 14 patent owners 20 patents	<ul style="list-style-type: none"> <li>• Currently 37 patent owners</li> <li>• 4473 patents in 56 countries</li> <li>• 1807 Licensees</li> </ul>
VC-1 <i>Program started in 2007</i>	Started with 16 patent owners 130 patents	<ul style="list-style-type: none"> <li>• Currently 21 patent owners</li> <li>• 972 patents in 36 countries</li> <li>• 356 Licensees</li> </ul>
MPEG-4 Visual part 2 <i>Program started in 2002</i>	Started with 20 patent owners 77 patents	<ul style="list-style-type: none"> <li>• Currently 29 patent owners</li> <li>• 1442 patents in 54 countries</li> <li>• 1189 Licensees</li> </ul>
MPEG-2 Systems <i>Program started in 2006</i>	Started with 8 patent owners 161 patents	<ul style="list-style-type: none"> <li>• Currently 10 patent owners</li> <li>• 258 patents in 29 countries</li> <li>• 242 Licensees</li> </ul>
IEEE 1394 <i>Program started in 1999</i>	Started with 6 patent owners 8 patents	<ul style="list-style-type: none"> <li>• Currently 10 patent owners</li> <li>• 275 patents in 22 countries</li> <li>• 134 Licensees</li> </ul>
MVC <i>Program started in 2012</i>	Started with 15 patent owners 112 patents	<ul style="list-style-type: none"> <li>• Currently 19 patent owners</li> <li>• 1139 patents in 45 countries</li> <li>• 37 Licensees</li> </ul>
HEVC <i>Program started Sept. 29, 2014</i>	Started with 23 patent owners 55 patents	<ul style="list-style-type: none"> <li>• Currently 32 patent owners</li> <li>• 1260 patents in 55 countries</li> <li>• 93 Licensees</li> </ul>
DisplayPort <i>Program started March 5, 2015</i>	Started with 4 patent owners 8 patents	<ul style="list-style-type: none"> <li>• Currently 5 patent owners</li> <li>• 23 patents in 4 countries</li> <li>• 19 Licensees</li> </ul>



# Potential Battery IP Pools



# LFP Joint Licensing Effort (est. 2011)

